

### **THE OFFICE ACTION**

In the Office Action issued on August 9, 2004, the Examiner objected to claim 1 as containing the recitation "in space", which the Examiner believes is confusing. The Examiner also objected to claim 2 for reciting "grating constant" without defining the same in the specification. The Examiner further objected to claim 4 as containing the term "templated by", which the Examiner believes is not clear. The Examiner also rejected claims 3 and 7 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter. The Examiner rejected claims 1-4 and 7 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,995,173 to Barberi et al. ("Barberi") in view of U.S. Patent No. 5,434,685 to Pirs et al. ("Pirs"). Finally, the Examiner further rejected claims 5 and 6 under 35 U.S.C. §103(a) as being unpatentable over Barberi in view of Pirs and further in view of U.S. Patent No. 4,590,146 to Wallbillich ("Wallbillich").

### **REMARKS**

Applicants have carefully considered the Office Action issued on August 9, 2004. Applicants respectfully request reconsideration of the application in light of the above amendments and the following comments.

#### **A. The Examiner's Objections Have Been Addressed**

The Examiner objected to claims 1, 2, and 4 for containing various informalities. These objections have been addressed in the above amendments. Specifically, claim 1 was amended to replace the recitation "in space" with "in a space". Claim 2 was amended to replace the term "grating constant" with "grating spacing". Claim 4 was amended to replace the phrase "templated by" with "bounded by". Applicants request withdrawal of these objections.

#### **B. The Pending Claims Comply with 35 U.S.C. §112**

The Examiner rejected claims 3 and 7 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter. Specifically, the Examiner objected to the use of the term "structure factor". The Examiner believed that by not defining the term in the specification, the meaning of the term was not clear and amenable to multiple meanings.

In making this rejection, the Examiner states that "upon review of the art of liquid

crystals, it appears to the Examiner that 'structure factor' may have multiple possible meanings...Because there is no clear definition in the art as to what a structure factor is, it is not currently possible to determine what Applicant means by 'structure factor'. Accordingly, the claims are rendered indefinite."

Applicants are somewhat puzzled by this rejection, but in an attempt to respond, submit the following. First, the Applicants would like to inform the Examiner that the term "structure factor" is not a term in the art of liquid crystals, but is instead a term used in the art of diffraction gratings. Perhaps this is the reason that the Examiner could not find a definition for this term. Applicants submit that the term "structure factor" is a conventional term of art in the field of diffraction gratings with a standardized definition. Although best expressed in mathematical terms, the structure factor is essentially the sum of the amplitudes of scattered radiation from a diffracting material. Applicants urge the Examiner to conduct additional research to familiarize herself with the meaning of this term, as it presents an additional point of patentability for the present invention. Applicants request withdrawal of this rejection based on the standardized definition for this term in the field of diffraction gratings.

**C. The Pending Claims Are Patentable Over Barberi in View of Pirs**

The Examiner rejected claims 1-4 and 7 under 35 U.S.C. §103(a) as being unpatentable over Barberi in view of Pirs. Applicants respectfully traverse.

Barberi is directed to a display device based on nematic liquid crystals with positive dielectric anisotropy between two transparent plates, at least one of which defines a quasi-bistable anchoring. By applying a temporary electric field to the cell, the anchoring is broken, allowing localized orientations of the liquid crystal molecules corresponding to the preferred orientation of the quasi-bistable anchoring. Switching is effected between an ordered hybrid texture and a disordered state, which is stabilized by the quasi-bistable anchoring. Using two crossed polarizers, this configuration allows for the non-transmission of light when the hybrid state is present while when an array of defects is present, light is transmitted (col. 3, lines 10-20). Nowhere does Barberi disclose or suggest the presence or use of a diffraction grating as disclosed and claimed in the present application.

Similarly, Pirs is directed to a ferroelectric liquid crystal cell for use in display devices and optical switching devices (col. 1, lines 8-12 and col. 7, lines 45-48). Pirs is specifically directed to cells utilizing ferroelectric liquid crystals, which have advantages

over cells employing nematic liquid crystals (such as in Barberi) in such applications (col. 1, lines 15-26). Pirs discloses the use of polymerizable microdroplets or globules randomly interspersed in the liquid crystal. The monomer droplets are polymerized to three dimensional structures, disposed predominantly on the cell walls. Pirs notes that the resulting cell is characterized by high transparency, and clear contrast (col. 7, lines 57-59). As with Barberi, Pirs fails to disclose or suggest the presence or use of a diffraction grating as disclosed and claimed in the present invention. A proposed combination of Barberi and Pirs fails to suggest the present invention for at least the following reasons.

First, there is no motivation to combine Barberi with Pirs. To properly combine references under §103, there must be some suggestion to combine the prior art references and a reasonable expectation of success. *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 56 USPQ2d 1456 (Fed. Cir. 2000). In making this determination, "the claimed invention must be considered as a whole, multiple cited prior art references must suggest the desirability of being combined, and the references must be viewed without the benefit of hindsight afforded by the disclosure." *In re Paulsen*, 31 USPQ2d 1671 (Fed. Cir. 1994). Here, there is no motivation to combine the teachings of the references since they actually teach away from such a combination and, in fact, present incompatible technologies.

In this respect, prior art references must be considered in their entirety, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 220 USPQ 303 (Fed. Cir. 1985). Here, Barberi discloses the use of nematic liquid crystal cells in his invention. The use of nematic liquid crystals allows for one practicing the invention to take advantage of the bistable anchoring properties of these, thus allowing rapid electrical addressing time and the formation of convective cells as required by Barberi (col. 1, lines 9-13; col. 4, lines 28-47; etc.). The formation of "convective cells" as described in Barberi are due to the charging of the nematic liquid crystal by an externally applied electric field, which in turn induces convective fluid movement and resulting hydrodynamic moments on the nematic surface directors.

Pirs, on the other hand, utilizes ferroelectric liquid crystalline material in its cell. As described above, this provides superior performance in the polymer stabilized displays of Pirs due, in part, to their structural bistability and electrical polarization properties. One practicing the invention of Barberi would not be motivated to combine the teachings therewith with those of Pirs, or vice versa.

Applicants are at a loss as to what type of combination of Barberi and Pirs the

Examiner is contemplating. Combining the teachings of the two references would not even be considered by one skilled in the art due to the inherent incompatibility of the two references. The use of a polymer network of various structural morphologies as taught by Pirs in the invention of Barberi would prevent or at least severely impede the creation of surface defects due to the Felici effect as taught by Barberi. That is, the use of a polymer network would actually work against the invention of Barberi as it would hinder the hydrodynamic instabilities and localized orientations required for the proper functioning thereof due to the volume and flow stabilization afforded by the polymer.

Here the Examiner has clearly found references allegedly disclosing the elements of the present invention, and proposed a combination based on these references even though they relate to completely disparate subject matter, provide no suggestion for such a combination, and indeed could most likely not be combined. This is a classic example of impermissible hindsight reconstruction. A recognition that something can be done is distinct from a motivation to do it. Absent such a suggestion or motivation, the Examiner's combining of the two references is a classic example of impermissible hindsight reconstruction. *Texas Instruments, Inc. v. U.S. Int'l Trade Comm'n*, 26 USPQ2d 1018 (Fed. Cir. 1993). In this respect, a showing of a suggestion, teaching, or motivation to combine prior teachings "must be clear and particular...[b]road conclusory statements regarding the teaching of multiple references, standing alone, are not 'evidence'." *In re Dembiczak*, 50 USPQ2d 1614 (Fed. Cir. 1999).

In attempting to provide support for the proposed combination, the Examiner states, "it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Barberi in view of Pirs so that the properties of the liquid crystal cell can be maintained, susceptibility to shock is reduced, the distance between the cell walls is maintained, and the flow of liquid crystals within the cell is prevented." (Office Action, page 6).

Where is the Examiner getting the concept that Barberi desires to prevent the flow of liquid crystal within the cell? In fact, Applicants submit that it is the very mobility of the liquid crystal in Barberi that allows for the breaking of the plate anchoring and the reorientation of the liquid crystal molecules. That is, as discussed above, it is the movement of the liquid crystal molecules that produces the hydrodynamic instabilities and allows for the breaking of the surface alignment of the plate. The use of a polymer network would hinder such movement. Thus, there is absolutely no motivation to combine the teachings of Barberi and Pirs.

Second, even if the references could somehow be combined, they would still not

render the present claims obvious under §103. As is well accepted, if a cited reference "is not analogous art, it has no bearing on the obviousness of the patent claim." *Jurgens v. McKasy*, 18 USPQ2d 1031 (Fed. Cir. 1991). In particular, "[t]he combination of elements from non analogous sources, in a manner that reconstructs the applicant's invention only with the benefit of hindsight, is insufficient to present a prima facie case of obviousness." *In re Oetiker*, 24 USPQ2d 1443. To determine whether a prior art reference is analogous art, it must be determined (1) whether the reference is "within the field of the inventor's endeavor," and (2) if not, whether the reference is "reasonably pertinent to the particular problem with which the inventor was involved." *In re Clay*, 23 USPQ2d 1058 (Fed. Cir. 1992). The claimed invention and references are in the same field of endeavor if they have essentially the same function and structure. *In re Deminski*, 230 USPQ 313 (Fed. Cir. 1986).

Here, neither Barberi nor Pirs is within the present field of endeavor nor are they reasonably pertinent to the particular problem addressed by the present invention. In this respect, neither Barberi nor Pirs is directed to the field of diffraction gratings. That is, Barberi and Pirs are both directed to liquid crystal cells for display devices. While it might possibly be said that all references relate to liquid crystal cells, this is far too remote a relationship to be considered analogous prior art. It cannot fairly be said that one skilled in the art to which Barberi or Pirs pertains (i.e. liquid crystal displays) would be familiar with diffraction gratings. As detailed above, these references are simply not pertinent to the particular problem with which the present invention is concerned. Thus, even assuming for purposes of argument that all of the limitations of the present claims can be found by culling from the prior art parameters to fit the claimed invention, it is improper to pick and choose individual elements from assorted prior art references to recreate the claimed invention without some motivation to do so. *Symbol Technologies, Inc. v. Opticon, Inc.*, 19 USPQ2d 1241 (Fed. Cir. 1991).

With further respect to claim 2, such a proposed combination does not disclose or suggest wherein the convective rolls are arranged with a grating spacing approximately twice the separation distance between the cell walls. With regard to claim 3, the proposed combination inherently does not disclose a structure factor or its adjustment, which is a diffraction grating property, since the proposed combination does not disclose or suggest a diffraction grating. With regard to claims 4-7, the proposed combination does not disclose a polymer network bounded by the convective roll structure.

For at least these reasons, applicants submit that the proposed combination of Barberi and Pirs is inappropriate and fails to render the present claims unpatentable.

**D. The Pending Claims Are Patentable Over Barberi in View of Pirs and Further in View of Wallbillich**

The Examiner rejected claims 5 and 6 under 35 U.S.C. §103(a) as being unpatentable over Barberi in view of Pirs and further in view of Wallbillich. Applicants respectfully traverse.

First, there is no motivation to combine the teachings of Wallbillich with Barberi or Pirs. Wallbillich is directed to the addition of a compound to stabilize a photopolymerizable mixture and prevent it from spontaneously polymerizing. Barberi and Pirs are directed to liquid crystal cells for use in displays as discussed above. Wallbillich relates to completely different subject matter than Barberi and Pirs. One skilled in the art of liquid crystal cells for use in displays would not be motivated to combine the teachings of Barberi or Pirs with Wallbillich.

In support of the rejection, the Examiner stated "it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Barberi in view of Wallbillich to prevent spontaneous thermal polymerization." This conclusion is incorrect for several reasons. The problem of spontaneous thermal polymerization is limited to water-soluble or water dispersible mixtures, consisting essentially of a base polymer, a polymerizable ethylenically unsaturated compound, and an initiator, as detailed in Wallbillich (col. 1, lines 5-10). Barberi does not contain ANY polymerizable material and therefore the proposed combination is simply meaningless. Pirs only discloses polymerizable monomers such as acrylates and the like. It does not disclose the mixtures of Wallbillich. Therefore, there is no need to stabilize the monomers of Pirs as detailed by the procedure of Wallbillich. Thus, there is no motivation to combine Wallbillich with either Pirs or Barberi.

Even if the references could be combined, they would still not disclose or suggest all the elements of the present claims. The Examiner appears to be confused in her understanding of the present claims. Claim 5 depends on claim 4 and recites that the polymerizable mixture contains an initiator that is activated during the step of stabilizing the convective roll structures by forming a polymer network. The polymerizable mixture itself is not stabilized (as in Wallbillich). Rather, it is the convective rolls that are stabilized by the formation of a polymer network. Claim 6

merely recites wherein the initiator is a photoinitiator and the initiation of polymerization is photoinitiation. Again, however, the polymerizable mixture is not stabilized, only the convective rolls are. For at least these reasons, the proposed combination fails to render the present claims obvious.

**CONCLUSION**

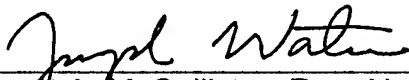
In view of the foregoing comments, Applicants submit that claims 1-7 are in condition for allowance. Applicants respectfully request early notification of such allowance. Should any issues remain unresolved, the Examiner is encouraged to contact the undersigned to attempt to resolve any such issues.

If any fee is due in conjunction with the filing of this response, Applicants authorize deduction of that fee from Deposit Account 06-0308.

Respectfully submitted,

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